

# Ebola Hemorrhagic Fever

Ebola hemorrhagic fever (Ebola HF) is one of numerous Viral Hemorrhagic Fevers. It is a severe, often fatal disease in humans and nonhuman primates (such as monkeys, gorillas, and chimpanzees).

Ebola HF is caused by infection with a virus of the family *Filoviridae*, genus *Ebolavirus*. When infection occurs, symptoms usually begin abruptly. The first Ebolavirus species was discovered in 1976 in what is now the Democratic Republic of the Congo near the Ebola River. Since then, outbreaks have appeared sporadically.

There are five identified subspecies of *Ebolavirus*. Four of the five have caused disease in humans: Ebola virus (*Zaire ebolavirus*); Sudan virus (*Sudan ebolavirus*); Tai Forest virus (*Tai Forest ebolavirus*, formerly *Côte d'Ivoire ebolavirus*); and Bundibugyo virus (*Bundibugyo ebolavirus*). The fifth, Reston virus (*Reston ebolavirus*), has caused disease in nonhuman primates, but not in humans.

The natural reservoir host of ebolaviruses remains unknown. However, on the basis of available evidence and the nature of similar viruses, researchers believe that the virus is zoonotic (animal-borne) with bats being the most likely reservoir. Four of the five subtypes occur in an animal host native to Africa.

A host of similar species is probably associated with Reston virus, which was isolated from infected cynomolgous monkeys imported to the United States and Italy from the Philippines. Several workers in the Philippines and in US holding facility outbreaks became infected with the virus, but did not become ill.

## Transmission

Because the natural reservoir of ebolaviruses has not yet been proven, the manner in which the virus first appears in a human at the start of an outbreak is unknown. However, researchers have hypothesized that the first patient becomes infected through contact with an infected animal.

When an infection does occur in humans, there are several ways in which the virus can be transmitted to others. These include:

- direct contact with the blood or secretions of an infected person
- exposure to objects (such as needles) that have been contaminated with infected secretions

The viruses that cause Ebola HF are often spread through families and friends because they come in close contact with infectious secretions when caring for ill persons.

During outbreaks of Ebola HF, the disease can spread quickly within health care settings (such as a clinic or hospital). Exposure to ebolaviruses can occur in health care settings where hospital staff are not wearing appropriate protective equipment, such as masks, gowns, and gloves.

Proper cleaning and disposal of instruments, such as needles and syringes, is also important. If instruments are not disposable, they must be sterilized before being used again. Without adequate sterilization of the instruments, virus transmission can continue and amplify an outbreak.

## Signs and Symptoms

### Symptoms of Ebola HF typically include:

- Fever
- Headache
- Joint and muscle aches
- Weakness
- Diarrhea
- Vomiting
- Stomach pain
- Lack of appetite

### Some patients may experience:

- A Rash
- Red Eyes
- Hiccups
- Cough
- Sore throat
- Chest pain
- Difficulty breathing
- Difficulty swallowing
- Bleeding inside and outside of the body

Symptoms may appear anywhere from 2 to 21 days after exposure to ebolavirus though 8-10 days is most common.

Some who become sick with Ebola HF are able to recover, while others do not. The reasons behind this are not yet fully understood. However, it is known that patients who die usually have not developed a significant immune response to the virus at the time of death.

## Risk of Exposure

In Africa, confirmed cases of Ebola HF have been reported in:

- Guinea
- Liberia
- Sierra Leone
- Democratic Republic of the Congo (DRC)
- Gabon
- South Sudan
- Ivory Coast
- Uganda
- Republic of the Congo (ROC)
- South Africa (imported)

The natural reservoir host of ebolaviruses, and the manner in which transmission of the virus to humans occurs, remain unknown. This makes risk assessment in endemic areas difficult. Currently, all cases of illness or death have occurred in Africa; no case has been reported in the United States.

During outbreaks of Ebola HF, those at highest risk include health care workers and the family and friends of an infected individual. Health care workers in Africa should consult the Infection Control for Viral Hemorrhagic Fevers In the African Health Care Setting to learn how to prevent and control infections in these setting. Medical professionals in the United States should consult the Interim Guidance for Managing Patients with Suspected Viral Hemorrhagic Fever in U.S. Hospitals.

## Diagnosis

Diagnosing Ebola HF in an individual who has been infected for only a few days is difficult, because the early symptoms, such as red eyes and a skin rash, are nonspecific to ebolavirus infection and are seen often in patients with more commonly occurring diseases.

However, if a person has the early symptoms of Ebola HF and there is reason to believe that Ebola HF should be considered, the patient should be isolated and public health professionals notified. Samples from the patient can then be collected and tested to confirm infection.

Laboratory tests used in diagnosis include:

Timeline of Infection	Diagnostic tests available
Within a few days after symptoms begin	<ul style="list-style-type: none"><li>- Antigen-capture enzyme-linked immunosorbent assay (ELISA) testing</li><li>- IgM ELISA</li><li>- Polymerase chain reaction (PCR)</li><li>- Virus isolation</li></ul>
Later in disease course or after recovery	<ul style="list-style-type: none"><li>- IgM and IgG antibodies</li></ul>
Retrospectively in deceased patients	<ul style="list-style-type: none"><li>- Immunohistochemistry testing</li><li>- PCR</li><li>- Virus isolation</li></ul>

## Treatment

Standard treatment for Ebola HF is still limited to supportive therapy. This consists of:

- balancing the patient's fluids and electrolytes
- maintaining their oxygen status and blood pressure
- treating them for any complicating infections

Timely treatment of Ebola HF is important but challenging since the disease is difficult to diagnose clinically in the early stages of infection. Because early symptoms such as headache and fever are nonspecific to ebolaviruses, cases of Ebola HF may be initially misdiagnosed.

However, if a person has the early symptoms of Ebola HF and there is reason to believe that Ebola HF should be considered, the patient should be isolated and public health professionals notified. Supportive therapy can continue with proper protective clothing until samples from the patient are tested to confirm infection.

Experimental treatment has been tested and proven effective in animal models but has not yet been used in humans.

## Prevention

The prevention of Ebola HF presents many challenges. Because it is still unknown how exactly people are infected with Ebola HF, there are few established primary prevention measures.

When cases of the disease do appear, there is increased risk of transmission within health care settings. Therefore, health care workers must be able to recognize a case of Ebola HF and be ready to employ practical viral hemorrhagic fever isolation precautions or barrier nursing techniques. They should also have the capability to request diagnostic tests or prepare samples for shipping and testing elsewhere.

Barrier nursing techniques include:

- wearing of protective clothing (such as masks, gloves, gowns, and goggles)
- the use of infection-control measures (such as complete equipment sterilization and routine use of disinfectant)
- isolation of Ebola HF patients from contact with unprotected persons

The aim of all of these techniques is to avoid contact with the blood or secretions of an infected patient. If a patient with Ebola HF dies, it is equally important that direct contact with the body of the deceased patient be prevented.

CDC, in conjunction with the World Health Organization, has developed a set of guidelines to help prevent and control the spread of Ebola HF. Entitled *Infection Control for Viral Hemorrhagic Fevers In the African Health Care Setting*, the manual describes how to:

- recognize cases of viral hemorrhagic fever (such as Ebola HF)
- prevent further transmission in health care setting by using locally available materials and minimal financial resources

# Questions and Answers on Ebola

**August 1, 2014**

The current Ebola outbreak is centered on three countries in West Africa: Liberia, Guinea, Sierra Leone, although there is the potential for further spread to neighboring African countries. Ebola does not pose a significant risk to the U.S. public. The CDC is surging resources by sending 50 more workers to the area to help bring the outbreak under control.

## **What is Ebola?**

Ebola virus is the cause of a viral hemorrhagic fever disease. Symptoms include: fever, headache, joint and muscle aches, weakness, diarrhea, vomiting, stomach pain, lack of appetite, and abnormal bleeding. Symptoms may appear anywhere from 2 to 21 days after exposure to ebolavirus though 8-10 days is most common.

## **How is Ebola transmitted?**

Ebola is transmitted through direct contact with the blood or bodily fluids of an infected symptomatic person or through exposure to objects (such as needles) that have been contaminated with infected secretions.

## **Can Ebola be transmitted through the air?**

No. Ebola is not a respiratory disease like the flu, so it is not transmitted through the air.

## **Can I get Ebola from contaminated food or water?**

No. Ebola is not a food-borne illness. It is not a water-borne illness.

## **Can I get Ebola from a person who is infected but doesn't have any symptoms?**

No. Individuals who are not symptomatic are not contagious. In order for the virus to be transmitted, an individual would have to have direct contact with an individual who is experiencing symptoms.

## **Are there any cases of individuals contracting Ebola in the U.S.?**

No.

## **What is being done to prevent ill passengers in West Africa from getting on a plane?**

CDC is assisting with active screening and education efforts on the ground in West Africa to prevent sick travelers from getting on planes. In addition, airports in Liberia, Sierra Leone and Guinea are screening all outbound passengers for Ebola symptoms, including fever, and passengers are required to respond to a healthcare questionnaire. CDC is also surging support in the region by deploying 50 additional workers to help build capacity on the ground.



# Questions and Answers on Ebola

## What is CDC doing in the U.S.?

On the remote possibility that an ill passenger enters the U.S., CDC has protocols in place to protect against further spread of disease. These include notification to CDC of ill passengers on a plane before arrival, investigation of ill travelers, and, if necessary, isolation. CDC has also provided guidance to airlines for managing ill passengers and crew and for disinfecting aircraft. CDC has issued a Health Alert Notice reminding U.S. healthcare workers of the importance of taking steps to prevent the spread of this virus, how to test and isolate suspected patients and how they can protect themselves from infection.

## What about ill Americans with Ebola who are being brought to the U.S. for treatment? How is CDC protecting the American public?

CDC has very well-established protocols in place to ensure the safe transport and care of patients with infectious diseases back to the United States. These procedures cover the entire process -- from patients leaving their bedside in a foreign country to their transport to an airport and boarding a non-commercial airplane equipped with a special transport isolation unit, to their arrival at a medical facility in the United States that is appropriately equipped and staffed to handle such cases. CDC's role is to ensure that travel and hospitalization is done to minimize risk of spread of infection and to ensure that the American public is protected. Patients were evacuated in similar ways during SARS.

## What does the CDC's Travel Alert Level 3 mean to U.S. travelers?

On July 31, the CDC elevated their warning to U.S. citizens encouraging them to defer unnecessary travel to Guinea, Liberia, and Sierra Leone over concerns that travelers may not have access to health care facilities and personnel should they need them in country.

For more information please see [this statement](#)  from the Department of State.

-###-

